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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated and shown as it is.

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[Document Name]Description

[Title of the Invention]Running support device

[Claim(s)]

[Claim 1]A running support device comprising:

Position information on vehicles.

Guide mechanism which displays and shows a guidance picture at a display screen to a course top beforehand set up in said vehicles based on map information corresponding to this position information.

An attainment detection means to detect having reached in a prescribed range of a winding part on a course to which said vehicles were set which should be bent.

2 screen displaying means which divides a display screen for a guidance picture by said guide mechanism, and a photography picture photoed by said photographing device two based on distance to a photographing device which is carried in vehicles and photos a surrounding situation of these vehicles, said vehicles detected by said attainment detection means, and said winding part, and is displayed.

[Claim 2]It is carried in vehicles, have a back photographing device which photos back of these vehicles, and a side photographing device which photos the side of these vehicles, and, [ said 2 screen displaying means ] The running support device according to claim 1 characterized by what is changed and displayed on a side photography picture photoed by said side photographing device from a back photography picture photoed by said back photographing device based on distance to said vehicles and said winding part.

[Claim 3]It is carried in vehicles, have a method photographing device of left-hand side which photos a method of left-hand side of these vehicles, and a method photographing device of right-hand side which photos a method of right-hand side of these vehicles, and, [ said 2 screen displaying means ] The running support device according to claim 1 displaying alternatively a method photography picture of right-hand side photoed by a method photography picture of left-hand side photoed by said method photographing device of left-hand side, or said method photographing device of right-hand side according to a direction which said vehicles bend in said winding part.

[Claim 4]A back photography picture photoed by said back photographing device, The running support device according to claim 1 provided with a picture inversion means to create a reversal photography picture to which the flip horizontal of the method photography picture of right-hand side photoed by a method photography picture of left-hand side photoed by said method photographing device of left-hand side or said method photographing device of right-hand side was carried out.

[Claim 5]When said 2 screen displaying means indicates by 2 screens, a method photography picture of left-hand side photoed by said method photographing device of left-hand side is displayed on left-hand side of a display screen divided into said two screens, The running support device according to claim 3 or 4 displaying a method photography picture of right-hand side photoed by said method photographing device of right-hand side on right-hand side of a display screen divided into said two screens.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the running support device which can supervise appropriately the part which serves as a dead angle of vehicles in the winding part on a running path.

[0002]

[Description of the Prior Art]when putting vehicles into a garage or making it retreat, [ a driver ] [ the direction of the back photographing camera installed in the vehicle rear in the part used as the dead angle of a fender mirror or a reflector glass ] [ adjust photo and ] A changeover switch is operated, and on the indicator (display screens, such as a liquid crystal) of a navigation part, it changes from a run guidance picture to a back photography picture, and displays. The driver is checking the situation of the part which looks at this photography picture and serves as a dead angle behind vehicles.

[0003]

[Problem to be solved by the invention]The conventional running support device checks the latest back of the vehicles used as the dead angle of a reflector glass, when checking back mainly in the case of vehicle warehousing or retreating vehicles, and it does not supervise the dead angle of the reflector glass produced especially in right-turn and a left-turn part during a run of a local street, or a door mirror. There is a problem referred to as that the manual by a driver must perform all of adjustment of the photography direction or a change in a run guidance picture and a photography picture.

[0004]This invention makes it SUBJECT to provide the running support device which can perform appropriately the surveillance in the winding part which serves as a dead angle easily and needs especially surveillance during a run of vehicles.

[0005]

[Means for solving problem]To achieve the above objects, the thing which is characterized by that this invention comprises the following.

Position information on vehicles.

Guide mechanism which displays and shows a guidance picture at a display screen to the course top beforehand set up in said vehicles based on the map information corresponding to this position information.

An attainment detection means to detect having reached in the prescribed range of the winding part on the course to which said vehicles were set which should be bent.

2 screen displaying means which divides a display screen for the guidance picture by said guide mechanism, and the photography picture photoed by said photographing device two based on distance to the photographing device which is carried in vehicles and photos the surrounding situation of these vehicles, said vehicles detected by said attainment detection means, and said winding part, and is displayed.

[0006]It is carried in vehicles, have a back photographing device which photos back of these vehicles, and a side photographing device which photos the side of these vehicles, and, [ said 2 screen displaying means ] Based on distance to said vehicles and said winding part, it changes and displays on a side photography picture photoed by said side photographing device from a back photography picture photoed by said back photographing device.

[0007]It is carried in vehicles, have a method photographing device of left-hand side which photos a method of left-hand side of these vehicles, and a method photographing device of right-hand side which photos a method of right-hand side of these vehicles, and, [ said 2 screen displaying means ] According to a direction which said vehicles bend in said winding part, a method photography picture of right-hand side photoed by a method photography picture of left-hand side photoed by said method photographing device of left-hand side or said method photographing device of right-hand side is displayed alternatively.

[0008]It had a picture inversion means to create a reversal photography picture to which the flip horizontal of the method photography picture of right-hand side photoed by a back photography picture photoed by said back photographing device, a method photography picture of left-hand side photoed by said method photographing device of left-hand side, or said method photographing device of right-hand side was carried out.

[0009]When said 2 screen displaying means indicates by 2 screens, a method photography picture of left-hand side photoed by said method photographing device of left-hand side is displayed on left-hand side of a display screen divided into said two screens, A method photography picture of right-hand side photoed by said

method photographing device of right-hand side is displayed on right-hand side of a display screen divided into said two screens.

[0010]

[Mode for carrying out the invention] Drawing 1 is a block diagram showing composition of a running support device concerning 1 embodiment of this invention. Hereafter, it explains according to figures.

[0011] 1 is a camera part which is carried in vehicles and photos run states, such as a road state of the vehicles circumference, the other car, and a motorbike. 11 is a vehicle speed sensor which detects mileage of vehicles, and a running speed, and a signal of a speedometer of a car, etc. are used. 12 is a blinkers operation switch which operates blinkers (blinker) for reporting course change of a self-vehicle to the surrounding vehicles. 13 is a drive circuit which sends a drive signal to the photography directional adjusting means 14a, 14b, and 14c, in order to adjust direction (the photography direction) of the back photographing camera 15a, the method photographing camera 15b of left-hand side, and the method photographing camera 15c of right-hand side with directions from the microcomputer 10 in the predetermined direction. 14a, 14b, and 14c support the corresponding back photographing camera 15a, the method photographing camera 15b of left-hand side, and the method photographing camera 15c of right-hand side, are a photography directional adjusting means which adjusts the photography direction, and comprise a motor, a gear, etc. 15a is a back photographing camera which is installed above a vehicle rear and photos a road state behind a self-vehicle, and a run situation of a succeeding vehicle. 15b is a method photographing camera of left-hand side which is installed near the indicator for forward left people of a method door mirror part of the forward left of vehicles, or the vehicles left-hand side side, and photos a bicycle, a pedestrian, etc. of a road state of a method of left-hand side of a self-vehicle, a car of a left contiguity lane, a run situation of a motorbike, or the way side belt. 15c is a method photographing camera of right-hand side which is installed near the indicator for forward right people of a method door mirror part of the forward right of vehicles, or the vehicles right-hand side side, and photos run situations, such as a road state of a method of right-hand side of a self-vehicle, a car of a right contiguity lane, and a motorbike. 16 with directions of the microcomputer 10 The back photographing camera 15a, the method photographing camera 15b of left-hand side, It is constituted from the Image Processing Division synchronizer for dividing a change display, flip horizontal processing of a picture, and a screen into two for a photography picture photoed with the method photographing camera 15c of right-hand side, and a routing assistance picture by the navigation part 2, and displaying a routing assistance picture and two split screens of photography pictures by microcomputer. The Image Processing Division synchronizer 16 The back photographing camera 15a, the method photographing camera 15b of left-hand side, It determines whether to carry out flip horizontal processing of the photography picture (back, a method of left-hand side, a method photography picture of right-hand side) photoed with the method photographing camera 15c of right-hand side, or to display a photography picture or a reversal photography picture on which [ of right and left of a screen divided into two ] side. Based on the vehicle speed sensor 11, the blinkers operation switch 12, and an output of the navigation part 2, 10 The back photographing camera 15a, It is a microcomputer it is directed that photography operation of the method photographing camera 15b of left-hand side and the method photographing camera 15c of

right-hand side is controlled, and displays the photography picture on the indicator 27 of the navigation part 2.

[0012]2 is a navigation part which searches for a course to a destination and displays a search course on the indicator 27 as a routing assistance picture. 21 is a GPS receiver which receives an electric wave from an artificial satellite (GPS Satellite), and computes position information etc. from the signal. 22 is direction sensors, such as a gyroscope sensor which detects a direction of movement of vehicles. 23 is a vehicle speed sensor which detects mileage of vehicles, and a running speed, and a signal of a speedometer of a car, etc. are used. 24 is a map data base which consists of a recording medium, its reading devices, etc., such as CD-ROM or DVD in which map information was memorized. 25 is an operation switch part for performing a destination input, registration, etc. 26 is a voice output part to compound a sound for guidance based on directions from the control part 20, and for a speaker etc. perform an audio assist. [ 27 ] [ based on a signal from the microcomputer 10 of the control part 20 or the camera part 1 ] A map (routing assistance picture) or the back photographing camera 15a for routing assistance, It is the indicator which comprised a liquid crystal display panel, a drive circuit, etc. which display a photography picture photoed with the method photographing camera 15b of left-hand side, and the method photographing camera 15c of right-hand side, and a routing assistance picture and two split screens of photography pictures are automatically displayed by directions of the microcomputer 10. 20 Position information from GPS receiver 21, direction data of the direction sensor 22, Processing which pinpoints a self-vehicle position based on running speed data of the vehicle speed sensor 23, and map information of the map data base 24, It is the control part which comprised a microcomputer which performs processing to which it shows vehicles in accordance with a course which searches for a running path to an inputted destination, and for which it was processed and searched, processing which searches an institution etc. based on predetermined conditions, etc. and accompanying RAM, a ROM, etc.

[0013]Drawing 2 is a flow chart of carrying-out image display processing of the microcomputer 10 of a running support device concerning 1 embodiment of this invention. Drawing 3 is a figure showing a back photography picture of a running support device concerning 1 embodiment of this invention, (a) is a photography picture and (b) is a reversal photography picture. Drawing 4 is a figure showing a method photography picture of left-hand side of a running support device concerning 1 embodiment of this invention, (a) is a photography picture and (b) is a reversal photography picture. Hereafter, it explains according to figures. Repetition execution of this processing is always carried out until vehicles arrive at a destination from a state which is running a course top for which it was searched by the navigation part 2 according to a routing assistance picture displayed on the indicator 27.

[0014]In Step S11, information is taken in from the navigation part 2 and it moves to Step S12. That is, vehicles are running a course top for which the navigation part 2 was searched based on a destination inputted beforehand, and take this search channel information, current position information on a self-vehicle, direction-of-movement information on a self-vehicle in a winding (left-turn or right-turn) part, etc. into the microcomputer 10. GPS receiver 21 detects a current position of vehicles, it compares with the map data base 24, and a current position is pinpointed on a map (search course) by the navigation part 2. When a GPS electric wave cannot be received, it complements by the direction sensor 22 and the vehicle speed sensor 23.

[0015]In Step S12, if it judged whether vehicles would have reached before [ prescribed distance ] the winding part on a search course, and it has reached before [ prescribed distance ] a winding part, and will move to Step S13 and will not have reached before [ prescribed distance ] a winding part, it moves to Step S20. A winding part is a crossing etc. which should change courses, such as right-turn on the course (search course) to which the self-vehicle was set beforehand, and left turn, and prescribed distance is 300 m. In order that a self-vehicle may slow down, there is a possibility that a succeeding vehicle may clash from behind, and it is necessary for it to be necessary not only to check a front road state, but to pay attention to the trend of a succeeding vehicle in a winding part.

[0016]In Step S13, a back photography picture and a routing assistance picture are displayed on two split screens, and it moves to Step S14. That is, the road state of the front, such as lane selection, is checked by the routing assistance picture by navigation, and it is necessary to also pay attention to the trend of back vehicles in a winding part. Then, the back photography picture photoed with the back photographing camera 15a which photos a back road state is displayed on one of the two (for example, right-hand side) of the indicator 27 which divided into two like drawing 3 (a). And the routing assistance picture by the navigation part 2 is displayed on other one of the two (left-hand side) of the indicator 27 which divided into two. Since the picture is carrying out the flip horizontal of the state of the back which the back photography picture photoed with the back photographing camera 15a and a driver check with a reflector glass etc., In order for a driver to make it in agreement with the back picture checked with a reflector glass etc. like drawing 3 (b), Image Processing Division is carried out and it may be made to display a back photography picture in the Image Processing Division synchronizer 16, so that right and left may be reversed. The user sets beforehand selection of any to display between the usual photography picture and the reversed photography picture as the Image Processing Division synchronizer 16 by operation of the operation switch part 25. The photography target and photographing area of the back photographing camera 15a are beforehand adjusted with the photography directional adjusting means 14a.

[0017]In Step S14, if it judges whether vehicles are close to a winding part of a running path, and is close to a winding part, and moves to Step S15 and is not close to a winding part, it stands by. That is, after vehicles have approached a winding part considerably, especially the driver needs to be cautious of a situation around vehicles (neighborhood) for course change (right-turn or left turn). It is judged that it acquired by the control part 20 by the side of the navigation part 2, and it approached that a self-vehicle reached before [ about 50 m ] a winding part. A time of a driver operating the blinkers (blinker) operation switch 12 of left turn or right-turn may be judged that vehicles approached a winding part. Since vehicles are slowed down in a winding part for course change, it may be judged that a time of it being checked that speed of vehicles detected by the vehicle speed sensor 11 has turned into below a prescribed speed approached a winding part.

[0018]In Step S15, a direction which should bend vehicles is judged, if the winding direction is left turn, it will move to Step S16, and if the winding direction is right-turn, it will move to Step S19. That is, a direction which especially a driver should be careful of when bending is judged, and this direction is judged based on the winding direction information in a winding part on a search course beforehand acquired from the

navigation part 2. It may judge from an operating condition of the blinkers (blinker) operation switch 12 of left turn or right-turn which a driver operated.

[0019]In Step S16, the method photography picture of left-hand side and a routing assistance picture are displayed on two split screens, and it moves to Step S17. That is, the road state of the front, such as lane selection, is checked by the routing assistance picture by navigation, and it is necessary to also pay attention to the trend of the motorbike and bicycle (or pedestrian) which are running the method of the left-hand side which goes into a dead angle easily by a door mirror in a winding part. Then, the method photography picture of left-hand side photoed with the method photographing camera 15b of left-hand side is displayed on one of the two (for example, left-hand side) of the indicator 27 which divided into two like drawing 4 (a) so that the road state of the direction (left) to bend can be grasped in detail. And the routing assistance picture by the navigation part 2 is displayed on other one of the two (right-hand side) of the indicator 27 which divided into two. When turning left in a winding part, there is an advantage become easy for a driver to recognize the direction of a photography picture to be by intuition by displaying the method photography picture of left-hand side on the left-hand side (left screen) of the indicator 27 divided into two. Since the picture is carrying out the flip horizontal of the state of the method of the left-hand side which the method photography picture of left-hand side photoed with the method photographing camera 15b of left-hand side and a driver check by a door mirror (or fender mirror), In order for a driver to make it in agreement with the picture checked by a door mirror etc. like drawing 4 (b), Image Processing Division is carried out and it may be made to display the method photography picture of left-hand side in the Image Processing Division synchronizer 16, so that right and left may be reversed. The user sets it as the Image Processing Division synchronizer 16 beforehand any to be displayed between the method photography picture of left-hand side, and the reversed method photography picture of left-hand side by operation of the operation switch part 25. The photography target and photographing area of the method photographing camera 15b of left-hand side are beforehand adjusted with the photography directional adjusting means 14b.

[0020]In Step S17, if it judges whether passage of a winding part was completed and passage of a winding part is completed, it will move to Step S18 and passage of a winding part will not be completed, it stands by. This judgment is made based on the winding part information and self-vehicle position information which were acquired from the navigation part 2.

[0021]In Step S18, it changes from 2 screen separation displays to the independent display of the routing assistance picture by navigation, and processing is finished. That is, since vehicles passed through the winding part, it returns to the routing assistance picture of the usual navigation.

[0022]In Step S19, the method photography picture of right-hand side and a routing assistance picture are displayed on two split screens, and it moves to Step S17. That is, the road state of the front, such as lane selection, is checked by the routing assistance picture by navigation, and it is necessary to also pay attention to the trend of the car which is running the right-hand side lane which goes into a dead angle easily, or a motorbike by a door mirror in a winding part. Then, the method photography picture of right-hand side photoed with the method photographing camera 15c of right-hand

side is displayed on one of the two (for example, right-hand side) of the indicator 27 which divided into two so that the road state of the direction (right) to bend can be grasped in detail. And the routing assistance picture by the navigation part 2 is displayed on other one of the two (left-hand side) of the indicator 27 which divided into two. When turning to the right in a winding part, it becomes easy for a driver to recognize the direction of a photography picture by intuition by displaying the method photography picture of right-hand side on the right-hand side (right screen) of the indicator 27 divided into two. Since the picture is carrying out the flip horizontal of the state of the method of the right-hand side which the photography picture photoed with the method photographing camera 15c of right-hand side and a driver check by a door mirror (or fender mirror), In order for a driver to make it in agreement with the picture checked by a door mirror etc., Image Processing Division is carried out and it may be made to display a photography picture in the Image Processing Division synchronizer 16, so that right and left may be reversed. The photography target and photographing area of the method photographing camera 15c of right-hand side are beforehand adjusted with the photography directional adjusting means 14c.

[0023]In Step S20, the routing assistance picture by the navigation part 2 is held, and processing is finished. That is, it is not located near the crossing which vehicles should bend, but a reflector glass and a door mirror on either side are enough as the check of the back of vehicles, or the side, Since it is not necessary to supervise the situation around vehicles in particular with the back photographing camera 15a, the method photographing camera 15b of left-hand side, and the method photographing camera 15c of right-hand side, it is considered as as [ the routing assistance picture of navigation ].

[0024]By this embodiment, a navigation part detects the position of vehicles as mentioned above, When the crossing which should be bent is approached, the part which should be especially supervised preponderantly according to the distance of vehicles and a winding part A back photographing camera, Since a screen is divided into the indicator of a navigation part two and both a routing assistance picture and a photography picture are displayed for the photography picture photoed with the side photographing camera on it, the channel selection in a crossing etc. and the surveillance of the vehicles circumference can be performed simultaneously.

[0025]In this embodiment, although the operation in routing assistance was explained, not the routing assistance to the destination but image display same also at the time of the operation which displays a self-vehicle position on a map may be performed, and a judgment of right-turn and left turn will be made by blinker operation in that case.

[0026]

[Effect of the Invention]As explained above, in this invention, it is easy to become a dead angle during a run of vehicles, and the running support device which can perform appropriately the surveillance in the winding part which needs especially surveillance can be provided.



## [Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the composition of the running support device concerning the 1 embodiment of this invention.

[Drawing 2] It is a flow chart of the image display processing of the running support device concerning the 1 embodiment of this invention.

[Drawing 3] It is a figure showing the back photography picture of the running support device concerning the 1 embodiment of this invention.

[Drawing 4] It is a figure showing the method photography picture of left-hand side of the running support device concerning the 1 embodiment of this invention.

[Explanations of letters or numerals] 1 .... A camera part and 2 .... A navigation part, 10 ... Microcomputer, 20 ... A control part, 11 ... A vehicle speed sensor and 21 ... GPS receiver, 12 ... A blinkers operation switch and 22 ... A direction sensor, 13 ... Drive circuit, 23 ... A vehicle speed sensor, 15a .. A back photographing camera and 24 ... Map data base, 15b [ ... A voice output part, 16 / ... The Image Processing Division synchronizer and 27 / ... An indicator, 14a 14b, 14c / ... Photography directional adjusting means. ] .. The method photographing camera of left-hand side, and 25 ... An operation switch part, 15c .. The method photographing camera of right-hand side, and 26

[Translation done.]